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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,128	11/21/2001	Thomas L. Toth	gems8081.110	1209
27061	7590	08/02/2004	EXAMINER	
ZIOLKOWSKI PATENT SOLUTIONS GROUP, LLC (GEMS)			HO, ALLEN C	
14135 NORTH CEDARBURG ROAD			ART UNIT	
MEQUON, WI 53097			PAPER NUMBER	
			2882	

DATE MAILED: 08/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/683,128

Applicant(s)

TOTH ET AL.

Examiner

Allen C. Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-11 is/are allowed.
- 6) ☒ Claim(s) 12-19 and 32-37 is/are rejected.
- 7) ☒ Claim(s) 20-31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 29042002.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: **122** (Fig. 4), **132** (Fig. 5), **166** (Fig. 7). Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 12-37 are objected to because of the following informalities:

- (1) Claims 12-19 recite a current profile. Claims 20-37 recite a tube current profile. It is unclear to what current profiles these limitations refer. The applicants are advised to replace them with --x-ray tube current profiles--.
- (2) Claim 34 recites a diagnostic tube current. It is unclear whether this current is same as the tube current recited in claim 32, or a different current.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 12, 13, 32, 33, and 35-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Toth (U. S. Patent No. 5,379,333).

With respect to claim 12, Toth disclosed a method of processing imaging data for a radiation emitting medical imaging device, comprising: acquiring imaging data of a subject (100); generating a set of projections (S_0 , S_{90}) for an VOI having a plurality of sub-volumes; acquiring a target noise index (prescribed image noise, column 4, lines 39-41); generating an x-ray tube current profile (Eq. 1) according to the target noise index; and enabling interactive adjustment of the generated x-ray tube current profile to convey a minimum allowable dose for each sub-volume in the VOI (column 4, line 56 - column 5, line 10).

With respect to claim 13, Toth disclosed the method of claim 12, further comprising the step of varying an application of a patient dose for each rotation of an x-ray source within a sub-volume in the VOI to limit x-ray exposure to sensitive organs of a patient (column 4, lines 63-68).

With respect to claim 32, Toth disclosed a radiation emitting medical device comprising: means (30) for receiving scan parameters (column 4, lines 12-14); means (26) for adjusting the

scan parameters automatically to generate a desired target image quality for a patient (column 4, lines 44-55); means (26) for modifying an x-ray tube current profile based on the adjusted scan parameters; and means (10) for scanning the patient using the modified x-ray tube current profile to reconstruct an image of the patient.

With respect to claim 33, Toth disclosed the medical device of claim 32, wherein the target image quality is determined by a target image noise index (column 1, lines 42-63).

With respect to claims 35-37, Toth disclosed the medical device of claim 32, wherein the means for modifying an x-ray tube current profile includes one of graphical adjustment and direct entry adjustment, a means for modifying only a portion of the x-ray tube current, and a means for modifying the x-ray tube current in sensitive organ regions for each gantry rotation (column 4, lines 56-68).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 14-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toth (U. S. Patent No. 5,379,333) as applied to claim 12 above.

With respect to claims 14 and 19, Toth disclosed the method of claim 12, further comprising the step of generating an effective x-ray tube current profile based on the varied patient dose for each gantry rotation (column 1, lines 42-63). However, although Toth taught

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displaying data on a graphical user interface (column 4, lines 14-16), Toth failed to teach plotting the x-ray tube current profile on the graphical user interface.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to display the x-ray tube current profile, since a person would be motivated to visually check the x-ray tube current profile before imaging a patient.

With respect to claim 15, Toth disclosed the method of claim 14, wherein user modulation of a portion of the plotted x-ray tube current profile on the graphical user interface (column 4, lines 56-62) causes the noise index to vary for the portion of the current profile modulated (This is inherent, since the noise is related to the x-ray tube current. (See Column 1, lines 42-63).

With respect to claims 16 and 17, Toth disclosed the method of claim 12, further comprising the step of adjusting at least one of a noise index and a relative dose index to acquire the image data of the subject (adjusting the x-ray tube current or dose is equivalent to adjusting the noise index. See column 1, lines 42-63).

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toth (U. S. Patent No. 5,379,333) as applied to claim 12 above, and further in view of Lavin *et al.* (U. S. Patent No. 5,772,585).

With respect to claim 18, Toth disclosed the method of claim 12, wherein the step of generating a set of projections includes the step of receiving a patient input (column 4, lines 12-14). However, Toth failed to teach accessing a patient demographic database.

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Lavin *et al.* disclosed a demographic database for managing patient medical information. The database contains, among other things, physician's diagnosis. In addition, this database is accessible over a network.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to set up a networked demographic database for managing patient medical information, since a person would be motivated to create a centralized database for storing and organizing patient medical information. Furthermore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to access a patient's demographic information when generating a set of projections, since a person would be motivated to confirm a patient's identity and to generate a set of projections appropriate with respect to VOI based on a physician's diagnosis.

8. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toth (U. S. Patent No. 5,379,333) as applied to claim 32 above, and further in view of Lavin *et al.* (U. S. Patent No. 5,772,585).

With respect to claim 34, Toth disclosed the medical device of claim 32, wherein the target image quality is determined by an x-ray tube current (column 1, lines 42-63). However, Toth failed to teach that the image quality is determined by a demographic database.

Lavin *et al.* disclosed a demographic database for managing patient medical information. The database contains, among other things, physician's diagnosis. In addition, this database is accessible over a network.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to set up a networked demographic database for managing patient medical

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information, since a person would be motivated to create a centralized database for storing and organizing patient medical information. Furthermore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine the target image quality based on a demographic database, since a person would be motivated to determine the target image quality based on physician's diagnosis.

Allowable Subject Matter

9. Claims 1-11 are allowed over the prior art.

10. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claims 1-11, the prior art fails to teach or fairly suggest a method of processing imaging data for a radiation emitting medical imaging device comprising the steps of automatically generating a predicted noise index from the received set of scan parameter values and generating an x-ray tube current profile based at least on the predicted noise index as claimed.

With respect to claims 20-25, the prior art fails to teach or fairly suggest a computed tomography system comprising a computer programmed to receive a user input to generate a target noise index, and generate an x-ray tube current profile according to the target noise index and a predicted noise index as claimed.

With respect to claims 26-31, the prior art fails to teach or fairly suggest a computer-readable medium having stored thereon a computer program having a set of instructions that, when executed by a computer, causes the computer to generate a predicted noise index from the

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pre-scan data, and generate an x-ray tube current profile based upon the predicted noise index and a target noise index as claimed.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- (1) Popescu (U. S. Patent No. 6,507,639 B1) disclosed method and apparatus for modulating the radiation dose form x-ray tube.
- (2) Ackelsberg *et al.* (U. S. Patent No. 6,285,741 B1) disclosed methods and apparatus for automatic image noise reduction.
- (3) Schol (U. S. Patent No. 6,178,228 B1) disclosed an apparatus having a number of operating parameters that can be set by an interactive control.
- (4) Wilting *et al.* (U. S. Patent No. 6,094,468) disclosed a adjustable CT device.
- (5) Popescu (U. S. Patent No. 5,822,393) disclosed method for adaptively modulating the power level of an x-ray tube of a CT system.
- (6) Williams *et al.* (U. S. Patent No 5,485,494) disclosed modulation of x-ray tube current during CT scanning.
- (7) Toth (U. S. Patent No. 5,400,378) disclosed dynamic dose control in multi-slice CT scan.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Allen C. Ho
Patent Examiner
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